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Effect of Fermented Mango Kernel Composite Meal on the Performance of Finisher Broiler Chickens

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Abstract
The study was conducted to investigate effect of replacing fermented mango kernel composite meal with maize in the diets of broiler finisher over a period of four weeks (28days). A total of 144 finisherbroiler chickens were randomly allotted to four dietary treatments of 36 birds each. Each treatment was replicated thrice with 12 birds per replicate. In each of the four diets fermented mango kernel composite meal (FMKCM) was used to replace maize at 0%, 10%, 15%, and 20% in T1, T2, T3, and T4 respectively. A non-significant ($p<0.05$) effect was revealed for feed intake, body weight gain and feed conversion ratio across treatments. It was concluded that FMKCM could replace maize up to 20% in broiler finisher diet without impeding growth.

Keywords: Mango kernel composite, maize, nutritive value, broiler finisher and performance indices

Introduction

In terms of total cost, energy is the most expensive item in poultry diets because of the amount required (Olomu, 1995). Maize is a conventional energy source and is currently, the most widely used grain crop in the Nigerian poultry industry because it provides the bulk of most poultry diets. However, the competition between its uses for food by man has continued to push the price of maize higher thereby, causing instability in the poultry industry. Hence, the need to search for alternative energy sources that are cheaper, locally available and have comparative nutritional value as the conventional sources to save the poultry industry from collapsing should be identified because, the production of maize in quantities that could meet the country's needs has not yet been realized Onuh (2006). Possible sources of cheap energy source to poultry are fruits and other agro industrial wastes (Ravindran and Blair, 1991). Several known examples include palm leaf meals, palm press fiber, cassava foliage, spent brewer's grains, sugar cane bagasse, rubber seed meal and some aquatic plants (Chadhokar, 1984). Mango by-products include: cull fruits which are fresh fruits unsuitable for human consumption, mango seeds which represent about 20-60% of the whole fruit, mango seed kernel which is inside the seed represents about 45-75% of the whole seed (Maisuthisakul *et al.,* 2009). Several researchers reported that the treated (de-oiled, soaked or boiled) mango seed kernel has been successfully used to replace maize in levels up to 15-20% in poultry diets (Ravindran and Sivakanesar 1996; Odunsi,2005). Half- ripe mango fruit reject have been processed into mango fruit reject meal by sun drying and milling, (orayaga, 2016).

This research investigates the feeding value of fermented mango kernel composite meal in the diet of broiler finisher chickens

Materials and Methods

The experiment was carried out at the Poultry Unit of the Livestock Teaching and Research Farm of the University of Agriculture Markudi, Benue State, Nigeria.Many cultivars of both indigenous and improved mango seeds were collected in the month of October, from Makurdi and Gboko Local Government Areas of Benue State. The seeds were broken to get the kernel by manual cracking. The fresh kernels were soaked in water at room temperature and allowed to ferment for a period of 2days (48hrs) rinsed thoroughly with clean water and sun-dried to reduce moisture content to less than 10% for proper drying. The dried mango kernel and other feed ingredients were milled separately into grit. Soybean was toasted to reduce anti-nutrients before crushing.Feeds were formulated to meet the nutritional requirements for broiler chicks (23% CP). Fermented mango kernel composite meal (FMKCM) replaced maize at 0%, 10%, 15% and 20% in treatmentsT1, T2, T3, and T4 respectively. The proximate composition was analyzed according to AOAC (2000) techniques. One hundred and forty four (144) un-sexed New farm size 28

days old broiler finisher were randomly selected and assigned to one (1) of the four (4) dietary treatments comprising of thirty six (36) broiler finishers per treatment. Each treatment was replicated thrice with 12 birds per replicate and the dietary treatments were administered over a period of 4 weeks. The birds were raised in deep litter cages; the cages were constructed with wire mesh and a wooden floor.Drinkers were washed and disinfected daily and fresh clean cool water was given to the bird*ad- libitum.* Feeders were washed once a week and also disinfected. Birds were vaccinated regularly following the vaccination schedule programme. Birds' body weights were taken weekly using electronic weighing balance. Wood shavings were changed when due. Antibiotics were given as therapeutic / prophylaxis when necessary. Appropriate diets (one of the four experimental diets) at equal quantities (900g) were given to the birds daily at about 8am. This amount was increased by 100g on weekly basis (as birds grew older). Data were collected on performance (feed intake, body weight, weight gain and efficiency of feed utilization). The birds were weighed on weekly basis and their differences were used to determined average weekly weight gain (AWWG). Feed intake was divided by weight gain to get the efficiency of feed utilization (EFU) and feed intake (FI) was calculated by subtracting left over feed from feed served.

The data obtained on all the parameters were subjected to one-way analysis of variance (ANOVA) and least significant difference method (LSD) was used to separate mean that differed significantly (Steel and Torrie, 1980). Results were presented as mean ± standard error of mean (SEM).

Table1. Composition of diet with (48 hours) fermented mango kernel composite meal for broiler finisher

Ingredients	Levels of inclusion (%)			
	0%	10%	15%	20%
Maize	50.88	45.79	43.25	40.70
FMKM	0.00	5.09	7.63	10.18
Soybean	32.52	32.52	32.52	32.52
BDG	5.50	5.50	5.50	5.50
Rice Bran	4.10	4.10	4.10	4.10
Bone Ash	2.50	2.50	2.50	2.50
Palm oil	3.00	3.00	3.00	3.00
Lysine	0.50	0.50	0.50	0.50
Analyzed nutrients:	0.30	0.30	0.30	0.30
Salt	0.40	0.40	0.40	0.40
Methionine	0.30	0.30	0.30	0.30
Vita/Min. Premix*				
Total	100.00	100.00	100.00	100.00
Crude Protein (%)				
M.E (Kcal/Kg)	20.41	19.95	19.72	19.49
	2965.19	2790.49	2703.32	2615.80

Results andDiscussion

The effect of fermented mango kernel composite meal (FMKCM) on performance of broiler finisher is presented in Table 2. The results for feed intake ranged from 828.00±102.00 to 966.00±116.00. A non-significant ($p< 0.05$)difference was recorded on feed intake. This findingswas in contrast with the report of Diarra *et al.* (2010) who replaced maize with boiled mango kernel meal up to 60% and had declined feed intake with increased supplementation. This could be as a result of the presence of anti- nutritional factors present in mango kernel such as saponin, oxalate (Oke and Latum, 1969), Cyanogenic glycoside (Onwuka, 2005), Phytate (Lucas *et al*., 1975), alkaloids (Harbone, 1980), flavonoid (Bohm *et al.,* 1974), and trypsin inhibitor (Kakade *et al.,* 1969).Increase in the amount of mango kernel in the diet has been known for inducing a linear depression of feed consumption due to the high level of tannin content which ends up retarding growth. (Odunsi, 2005). Fermentation would have reduced the anti-nutrients to a more tolerable state and thereby increasing the palatability of the feed, also, the inclusion level was lower in this study.The results for body weight gainranged from 167.25± 35.60 to 180.60± 14.20. The weight gain did not differ ($p>0.05$) among treatment groups and this was in disagreement with the reports of Diarra *et al*. (2015);

Orayaga *et al.* (2015) and Abang *et al*. (2015) who replaced maize with boiled mango kernel meal in broiler chicks diets; mango fruit reject composite meal in broiler finisher diets and sun-dried mango kernel meal in quails diets respectively and observed depressed weight gain across treatments. This could be due to the varying processing methods adopted.Feed conversion ratio (FCR) ranged from 5.57± 3.65 to 6.36 ±1.34. Results revealedthat feed conversion ratio was not significantly (p>0.05) affectedthis contradicted the assertions of Orayaga *et al.* (2015) and (Dairra *et al*., 2015) but was in line with the finding of Abang *et al*. (2015). This may be due to the experimental animals, test ingredients and the processing methods employed.

Table 2. The effect of FMKCM on growth performance of finisher broiler replacement levels

Parameters	T1(0%)	T2(10%)	T3(15%)	T4 (20%)
Initial mean weight	441.66±30.30	440.13±25.10	438.83±34.40	434.38±44.00
Final meanweight	1277.90 ± 53.40	1297.72±32.30	1309.00±53.00	1337.30±26.30
Mean weekly feed intake	841.00±106.00	948.40±99.10	966.00±116.0	828.00±103.00
Mean weekly weight gain	167.25±35.60	171.52±29.40	174.03±17.60	180.60±14.20
FCR	6.11±1.27	5.57±3.65	6.36±1.34	5.18±0.78

Conclusion

Results showed that FMKCM could be incorporated into broiler finisher's diet up to 20% without compromising their performance.

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